



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,668	06/25/2001	Meng Yao	D/A1265	8867

7590 05/01/2006

Patent Documentation Center
Xerox Corporation
Xerox Square 20th Floor
100 Clinton Ave. S.
Rochester, NY 14644

EXAMINER

HUNTSINGER, PETER K

ART UNIT	PAPER NUMBER
----------	--------------

2625

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/888,668	YAO, MENG	
	Examiner	Art Unit	
	Peter K. Huntsinger	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/18/05 has been entered.

Response to Arguments

2. Applicant's arguments with respect to claims 1-5 and 9-15 have been considered but are moot in view of the new ground(s) of rejection.

3. Applicant's arguments with respect to claims 6-8 have been fully considered but they are not persuasive.

Applicant argues on page 10 of the remarks that:

Stanich does not teach or suggest an initial screen pattern being designed to provide a visually pleasing, blue noise dot pattern when thresholded.

- a. Examiner respectfully disagrees. Stanich et al. discloses a blue noise screen (abstract).

Applicant argues on page 13 of the remarks that:

Stanich does not teach or suggest using two different clustering criteria for different sets of gray levels.

b. Examiner respectfully disagrees. Stanich et al. disclose not placing pixels vertically or horizontally adjacent to each other until after a gray level threshold (col. 5, lines 30-36). Utilizing the checkerboard pattern (col. 5, lines 16-19), this limits using a constrained checkerboard pattern until a gray level threshold is reached. After the threshold is reached a new clustering criteria can be set to only place black pixels horizontally or vertically next to preexisting black pixels (col. 5, lines 23-36).

Applicant argues on page 14 of the remarks that:

Stanich and/or Chen do not teach or suggest changing the constraining pattern as claimed at the levels claimed.

c. Examiner respectfully disagrees. Stanich et al. disclose changing the constraining pattern at a gray level (col. 3, lines 29-31). Chen et al. disclose specific gray values (Fig. 3). Stanich et al. and Chen et al. are combinable because they are from the same field of halftoning. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to change the constraining pattern at a particular gray level. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stanich et al. Patent 6,597,813 and in further view of Chen et al. Patent 4,668,995.

Referring to claims 1 and 9, Stanich et al. disclose a halftone processor for converting a gray scale image comprising a plurality of m-bit pixels to a halftoned image comprising a plurality of n-bit pixel images, where $m > n$, the processor comprising: a memory storing a stochastic screen, the screen comprising a set of threshold values (dither mask 13 of Fig. 1, col. 4, lines 11-17); and a comparator receiving the gray scale image and the screen, the comparator comparing, on a pixel-by-pixel basis, a value of each pixel in the gray scale image to a corresponding threshold value in the screen to produce the halftoned image (comparator 14 of Fig. 1, col. 4, lines 14-16); wherein substantially all the threshold values corresponding to gray levels between g_{s1} and g_{s2} coincide with black positions in a constraining checkerboard pattern and substantially all the threshold values corresponding to gray levels between g_{s2} and g_{s3} coincide with white positions in the constraining checkerboard pattern (col. 3, lines 29-37). Stanich et al. do not disclose expressly memory storage for the stochastic screen. It is inherent that the stochastic screen of Stanich et al. would need to be stored on RAM for the screen to be applied to the image and the halftoning process to be preformed. Stanich

Art Unit: 2625

et al. disclose not placing pixels vertically or horizontally adjacent to each other until after a gray level threshold (col. 5, lines 30-36). Utilizing the checkerboard pattern (col. 5, lines 16-19), this limits using a constrained checkerboard pattern until a gray level threshold is reached. A checkerboard pattern of with black pixels at every 45-degree angle pixel (col. 6, lines 61-66) would correspond to a 50% dither. Stanich et al. disclose a gray level of 0 corresponds to 0% black and a gray level of g_i corresponds to 100% black. Stanich et al. do not disclose expressly wherein $g_{s1} > g_{s2} > g_{s3}$ for gray levels $0 < g_s < 2^m$, wherein $g_s = 0$ corresponds to 100% black and $g_s = 2^m$ corresponds to 0% black. Chen et al. disclose wherein $g_s = 0$ corresponds to 100% black and $g_s = 2^m$ corresponds to 0% black (Fig. 3, col. 6, 57-60). Stanich et al. and Chen et al. are combinable because they are from the same field of halftoning. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign a gray level of 0 to 100% black and the greatest gray level to 0% black. The motivation for doing so would have been to count the number of white pixels instead of the number of black pixels for calculating a gray value. Therefore, it would have been obvious to combine Chen et al. with Stanich et al. as specified in claims 1 and 9.

Referring to claim 6, Stanich et al. disclose a method of generating a halftone screen for converting an image received at d levels, for reproduction at c levels, where $d > c$, the method, in optional sequence, including: (A) generating an initial screen pattern for a first gray level, the initial screen pattern being designed to provide a visually pleasing, blue noise dot pattern when thresholded and wherein substantially all black pixels in the initial screen pattern correspond to black pixels in a constraining

Art Unit: 2625

checkerboard pattern (block 21 of Fig. 2, col. 5, lines 9-37); (B) generating a subsequent screen pattern corresponding to a specific gray level that is darker than the first gray level, the subsequent screen pattern maintaining the arrangement of black pixels of any screen pattern corresponding to a lighter gray level and further including at least one more black pixel, wherein the least one more black pixel is at a location corresponding to a black pixel in the constraining checkerboard pattern (block 25 of Fig. 2, col. 5-6, lines 60-67, 1-6); (C) repeating (B) for a plurality of specific gray levels between the first gray level and a second gray level (block 28 of Fig. 2, col. 6, lines 6-16); (D) generating a second subsequent screen pattern corresponding to a specific gray level that is darker than the second gray level, the second subsequent screen pattern maintaining the arrangement of black pixels of every screen pattern corresponding to a lighter gray level and further including at least one more black pixel, wherein the least one more black pixel is at a location corresponding to a white pixel in the constraining checkerboard pattern (block 42 of Fig. 3, col. 6, lines 22-28); and (E) repeating (D) for a plurality of gray levels between the second gray level and a third gray level (block 46 of Fig 3., col. 6, lines 39-43). Stanich et al. do not disclose expressly the specific gray level value of 50%. Chen et al. disclose a specific gray value of 50% (level 8 of Fig. 3). Stanich et al. and Chen et al. are combinable because they are from the same field of halftoning. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to place black pixels on white spaces in a checkerboard before a gray level value of 50%. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus

Art Unit: 2625

increase image quality (col. 8, lines 3-24 of Stanich). Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claim 6.

Referring to claims 3, 7, and 10, Stanich et al. disclose threshold values corresponding to gray levels for constraining a checkerboard pattern but do not disclose expressly a specific percent black dither that correspond to the gray levels. Chen et al. disclose a specific gray level value of approximately 5% (level 15 of Fig. 3) and a specific gray level of approximately 40% (level 10 of Fig. 3). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign thresholds between a 5% black dither and a 40% black dither to a first gray level group. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich). Further, Stanich et al. disclose a generic gray level from which to switch patterns and 5% and 40% are simply two of many specific gray levels. Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claims 3, 7, and 10.

Referring to claims 4, 8, and 11, Stanich et al. disclose threshold values corresponding to gray levels for constraining a checkerboard pattern but do not disclose expressly a percent black dither that correspond to the gray levels. Chen et al. disclose a specific gray level value of approximately 40% (level 10 of Fig. 3) and a specific gray level of approximately 50% (level 8 of Fig. 3). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign thresholds between a 40%

Art Unit: 2625

black dither and a 50% black dither to a second gray level group. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich). Further, Stanich et al. disclose a generic gray level from which to switch patterns and 40% and 50% are simply two of many specific gray levels. Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claims 4, 8, and 11.

Referring to claim 5, Stanich et al. disclose threshold values corresponding to gray levels for constraining a checkerboard pattern but do not disclose expressly a percent black dither that correspond to the gray levels. Chen et al. disclose a specific gray level value of approximately 5% (level 15 of Fig. 3), a specific gray level of approximately 40% (level 10 of Fig. 3), and a specific gray level of approximately 50% (level 8 of Fig. 3). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign thresholds between a 5% black dither and a 40% black dither to a first gray level group, and thresholds between a 40% black dither and a 50% black dither to a second gray level group. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich). Further, Stanich et al. disclose a generic gray level from which to switch patterns and 5%, 40%, and 50% are simply three of many specific gray levels. Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claim 5.

Referring to claims 12 and 14, Stanich et al. disclose threshold values corresponding to gray levels for constraining a checkerboard pattern but do not disclose expressly a percent black dither that correspond to the gray levels. Chen et al. disclose a specific gray level of approximately 40% (level 10 of Fig. 3). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign a threshold of 40% to a gray level group. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich). Further, Stanich et al. disclose a generic gray level from which to switch patterns and 40% is simply one of many specific gray levels. Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claims 12 and 14.

Referring to claims 13 and 15, Stanich et al. disclose threshold values corresponding to gray levels for constraining a checkerboard pattern but do not disclose expressly a percent black dither that correspond to the gray levels. Chen et al. disclose a specific gray level of approximately 15% (level 14 of Fig. 3). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to assign a threshold of 15% to a gray level group. The motivation for doing so would have been to eliminate objectionable periodic patterns in the halftone and thus increase image quality (col. 8, lines 3-24 of Stanich). Further, Stanich et al. disclose a generic gray level from which to switch patterns and 15% is simply one of many specific gray levels. Therefore it would have been obvious to combine Chen et al. with Stanich to obtain the invention as specified in claims 13 and 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter K. Huntsinger whose telephone number is (571)272-7435. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (571)272-7471. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PKH



KIMBERLY WILLIAMS
SUPERVISORY PATENT EXAMINER